6. ENVIRONMENTAL CONSEQUENCES

Consistent with CW Planning Guidance (EP1165-2-1, ER1105-2-100), EO 11990, NEPA and CEQ regulations, plan formulation of flood damage reduction features have avoided adverse project effects (project implementation or O&M) to the fullest extent practicable. When adverse effects could not be avoided, they were minimized. The minimal adverse effects resulting from project implementation or O&M will be mitigated in accordance with guidelines and regulations listed above in addition to Section 401 of the Clean Water Act, the NJ Flood Hazard Area Control Act and the NJ Freshwater Wetlands Protection Act. Following is a summary of anticipated adverse effects of the environmental consequences anticipated to accompany the recommended alternative for flood damage reduction.

The discussion of environmental effects of flood damage reduction alternatives focuses on the selected flood damage reduction plan. The discussions describe the anticipated effects of this plan relative to benchmarks provided by the no-action alternative.

Direct impacts to wetlands resulting from the levee/floodwall installation would be limited to the footprint of the floodwall/levee and its associated rights-of-way. The levee/floodwall design includes closure structures on tributaries that would continue to allow hydraulic flow to the wetland areas located on the un-protected side of the levee/floodwall. The only time the hydrology of these wetland areas would be affected is during lower frequency storm events when the closure structures would be activated to prevent flooding on the protected side of the levee/floodwall. No long term changes to the existing hydroperiod of the wetlands located south of the proposed flood control structure are anticipated. Consequently, impacts to these wetland areas would be temporary and minor, and would not require mitigative measures.

The ponding areas were designed to maximize use of existing wetland and/or low-lying areas. Impacts associated with the interior drainage areas may result in a conversion in wetland cover type but not a loss of wetlands. The following sections identify the temporary and long-term beneficial and adverse impacts associated with the selected flood damage reduction measures.

6.1 Physical Setting

Impacts on geology, topography, and soils resulting from construction and maintenance of the selected alternative are expected to be minimal. No impacts on geology will occur because bedrock elevations would be below the depth of proposed excavation, fill, and structure foundations. A change in topography would occur, but is expected to be minimal. The levee/floodwall would be constructed of clean fill to a height of +216 NGVD.

Soil erosion is expected to be minimal during construction because the surrounding topography is flat, reducing stormwater runoff capability. No significant or long-term impacts would occur on native soil grain size, structure, nutrient status, or organic matter content, because only clean material will be used for levee construction. In addition, soil erosion and sedimentation would be minimized during construction through the use of a soil erosion and sediment control plan.

6.2 Climate and Weather

Climate and weather will not be adversely affected by construction and maintenance of the flood damage reduction measures.

6.3 Water Resources

Construction and maintenance of the proposed flood damage reduction measures would have no adverse impact to regional hydrogeology and groundwater resources, as no fill or excavation would take place below the ordinary high water mark.

6.3.1 Surface Water Resources

Surface water quality will be temporarily impacted during construction of the tributary closure structures, and levees/floodwalls because of increased suspended sediments in the water column. However, best management practices for erosion and sediment control will be implemented during construction to reduce any potential runoff, sedimentation or turbidity into the tributaries or the Passaic River as a result of the proposed project.

Closure Structures: A temporary running stream diversion would be installed prior to the closure structure installation. This stream diversion will continue to convey flowing water around the work area during construction, which allows aquatic and wetland dependant wildlife continued passage during construction.

Levee / Floodwall: Implementation of the levee/floodwall would result in no greater depths and duration of flooding south of the floodwall/levee for any flood event that would have inundated this area at its present elevation. No impact will occur to the hydroperiod and/or vegetative composition of the flood plain forest and other wetland habitats located south of the floodwall/levee.

6.3.2 Wetlands

Long-term effects of the selected flood damage reduction plan include changes to vegetation cover types due to the construction and maintenance of the levee/floodwall and tributary closure structures. Specifically, a total of 1.10 acres of wetland habitat will be permanently impacted in order to construct the floodwall/levee, closure structures and permanent access and maintenance right-of-way.

In accordance with Section 401 of the CWA, National Environmental Policy Act, CEQ, CW Planning Guidance, EO 11990, stream encroachment, and NJ Freshwater Wetlands Protection Act regulations, the project was designed such that the levees/floodwalls would avoid and minimize impacts to wetland areas to the maximum extent practicable. Several iterations of the selected plan were developed during the mitigation process. Each iteration successively reduced overall freshwater wetland. Additionally, the final two iterations were designed to avoid impacts to highly functional and valuable forested wetlands and direct unavoidable impacts to less functional wetland areas within the project corridor. The selected plan removed all but the western 61 linear feet of levee and replaced it with floodwall. Although this change served to increase aesthetic impacts to lots 18 and 18.01and overall project cost, it reduced the total wetland impacts by .07-acres. Therefore, the selected plan was designed such that the levees/floodwall would avoid and minimize impacts to wetland areas to the maximum extent practicable. However, there were several areas where it was not possible to avoid wetland impacts due to engineering constraints. The proposed mitigation plan will offset these impacts (see Section 6.15).

6.4 Wildlife Resources

Construction of the proposed flood damage reduction measures could have minor, short-term impacts on fish and wildlife habitat and populations occurring within the project corridor. During construction, the clearing and grading of work areas could result in the loss of aquatic, vegetative, and some subsurface cover due to the excavation and movement of soil. These construction activities could result in the temporary and permanent loss of habitat and possible mortality of less mobile, burrowing, and/or denning species of common wildlife such as small rodents, snakes, turtles, and amphibians. During the construction period resident species and transient wildlife may seek refuge in adjacent habitats until the project is completed. Following construction, wildlife species are expected to resume their normal habits consistent with post-construction habitat availability in and around the study area. In addition, impacts to wildlife will be compensated through implementation of the selected mitigation plan.

6.5 Threatened and Endangered Species

Minor and temporary impacts to State threatened and endangered species habitat (barred owl and red-shoulder hawk) may occur due to the construction of the proposed levee/floodwall and tributary closures. Additionally, the proposed floodwall is situated adjacent to an area that was identified as "potential" bog turtle (*Clemmys mulhenbergii*) habitat by the FWS.

The results of the Phase I and Phase II Bog Turtle Surveys indicated that there is not a population of bog turtles located within the project corridor. Furthermore, the results of these surveys indicated that the potential bog turtle habitat identified by FWS is not suitable for bog turtle and went on to state that " It would be almost impossible for bog turtles to nest anywhere along the right-of-way or in the surrounding hardwood floodplain forest due to the hydrologic influence of the Passaic River…". Although these conclusions were reached, the floodwall was re-configured to reduce impacts to the *Phragmites* dominated emergent wetlands identified as potential bog turtle habitat. An inspection of this portion of the floodwall corridor would be completed by a qualified herpetologist prior to construction. Such a herpetologist may also be present on-site during construction of this portion of the floodwall if required by FWS. Furthermore, the construction of this portion of the floodwall will not take place during the turtles dormant season (September 15 – April 15)

The Phase I and II bog turtle survey was conducted in accordance with the USFWS requirements for bog turtle habitat and presence/absence surveys. The results of these surveys were accepted by FWS and NJDEP non-game fish and wildlife. The State of New Jersey and the ACE will continue to coordinate with FWS regarding residual bog turtle issues during construction.

Barred owl (*Strix varia*) was observed approximately 1,000 feet south of the proposed floodwall alignment. This species prefers wooded environs for perching, nesting, and feeding. Therefore the floodwall alignment has been adjusted to avoid impacts to intact upland and wetland forest. Individual barred owl's may be displaced temporarily during construction. Impacts to the owl's habitat are not anticipated and temporary construction impacts to individuals is expected to be minimal due to their high tolerance of human presence and the presence of large areas of suitable habitat located adjacent to the project corridor.

In some cases, the disturbance created by construction activities would lead to the temporary displacement of these species (e.g., red shouldered hawk, wood turtle) which would necessitate

their finding refuge elsewhere until construction is completed. In other cases, impacts to habitat would lead to permanent displacement, which would necessitate their finding refuge elsewhere. Trained biologists qualified in the identification of threatened and endangered species will inspect the project corridor prior to construction and will also be on-hand during the construction phase. During construction, biologists will ensure that no threatened and endangered species are harmed and that impacts to habitat are minimized to the greatest extent possible.

6.6 Air Quality

Minor, yet temporary impacts to air quality are projected to occur in areas immediately adjacent to the site of the proposed flood damager reduction project. The primary source of air pollution will result from construction equipment. Construction related air quality impacts would be temporary; as they will be confined to the time required to construct the proposed improvements and will not continue during the operational phase. Additional air quality controls will be instituted throughout the life of the proposed action to minimize any potential adverse effects. Construction related air pollution is not anticipated to pose a significant environmental impact to the surrounding area.

6.7 Cultural and Historic Resources

A cultural resources investigation was undertaken to bring the selected flood damage reduction plan into compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. As a Federal agency the Corps has certain responsibilities concerning the identification, protection and preservation of significant cultural resources within the Area of Potential Effects (APE) of any proposed project. Significant cultural resources are any material remains of human activity that are listed on, or eligible for inclusion on, the National Register of Historic Places (NRHP). Other statutes and regulations authorizing the Corps to undertake these responsibilities include Section 101 (b) (4) of the National Environmental policy Act of 1969 and the Advisory Council Procedures for the Protection of Cultural Properties (36 CFR Part 800).

Background research indicated that there are no previously identified cultural resources within the project area. The sensitivity for Native American resources was considered low due to the fact the area was low-lying and wet, having been formed from the draining of Glacial Lake Passaic. Native American sites identified near the Passaic River in the project vicinity through other studies were located on terraces or knolls above the low-lying land. There are no natural areas of high ground within the study area and all dry land was found to consist of man-made fill. Historic map research indicted no structures within the project area suggesting that the potential for historic archaeological sites was limited.

Fieldwork was conducted on November 15 and 16, 2002, and was carried out by Corps staff under the supervision of the project archaeologist. Soils were excavated in accordance with the encountered stratigraphy and taken to natural subsoil. In certain instances impenetrable fill was present and it was not possible to excavate to subsoil. All soils were screened through 1/4-inch hardware mesh. All cultural materials recovered were modern and were noted and discarded in the field. No artifacts were retained. A total of 21 shovel tests were excavated along the recommended levee/floodwall alignment. Most of the tests encountered water within a few inches of the ground surface. Soils consisted primarily of clays. No significant cultural materials were encountered.

The proposed levee/floodwall alignment runs behind houses and commercial/industrial structures that front on Valley Road. East of the South Main Street is primarily commercial/industrial in nature. Modern businesses with their parking lots line Valley Road. To the west are mid-20th century dwellings.

A closure structure is proposed for an unnamed tributary at its crossing with Valley Road. The tributary is located ¾ of a mile east of the proposed levee/floodwall. The present structure is a 54-inch concrete pipe. There is evidence of stone in the area around the culvert but nothing is set in courses. Any evidence of previous structure to carry the watercourse beneath the road was destroyed with the installation of the new culvert.

No significant archaeological resources were identified. There are no historic structures within the project area. It is the Corps opinion that this project will have no effect on cultural resources and no further work is required if project plans remain as proposed. The New Jersey State Historic Preservation Officer concurred with this opinion on 28 February 2003. While unlikely, if cultural resources are encountered during construction, all work will be halted and the find reported to the Corps project archaeologist. Construction will not resume until an assessment of the resources involved has been carried out by the project archaeologist and coordination with the New Jersey Historic Preservation Office (NJHPO) has been completed.

6.8 Hazardous, Toxic, and Radioactive Waste

No HTRW issues are anticipated to arise during project implementation. Should any concerns arise during the construction phases, procedures for this contingency will be specified in the construction contract.

6.9 Socio-Economics

The flood damage reduction measures would not have significant growth-inducing, or growth-inhibiting, impacts on existing or future demographic characteristics because the area is almost completely developed. The Project will have no impact on the number, density, or racial composition of residents living within the Long Hill Township area.

The selected flood damage reduction plan would have a direct positive economic impact on existing business in the study area due to reduced potential for future flood and to access to businesses during storm events. There also will be a minor, indirect beneficial economic impact on the local economy during construction as a result of the introduction of construction workers and the resulting purchase of supplies and food during the construction phase.

The Project will have a direct positive impact on housing and structures in the study area due to a reduction in the potential for future flood damage to existing properties, and the subsequent reduction in associated costs to repair such damages. The Plan also will have a positive impact on residential property values along the Passaic River at Long Hill Township due to the reduced probability of flood damages.

6.10 Land Use

Construction of the selected flood damage reduction measures will not adversely affect the current land use in the Passaic River at Long Hill Township study area. The area's economic

growth and development will not be restricted by the levees/floodwalls since they have been specifically located in areas that are not suitable for residential, commercial, or industrial use. Implementation of the selected plan will benefit the current and future land uses in the Long Hill Township area by offering improved protection to homes, businesses, roads, churches, schools, parks, stores, and various other provided services.

6.11 Noise

Construction of the flood damage reduction measures would result in a temporary, but minor increase in noise as a result of the use of construction equipment. Minor short-term impacts on noise levels would result from the construction phase. Site preparation (generally two weeks prior to construction), construction activities, and the necessary heavy equipment are likely to produce noise levels in the 70 to 90 dBA range (50 feet from the source). These noises would be masked by the high background levels of traffic and community activity or dissipated by distance.

Noise impacts are projected to occur in areas immediately adjacent to the site of the proposed flood control improvements. While residential sensitive receptors have been identified within 100 feet of the proposed action, construction related noise is not anticipated to pose a significant environmental impact to the surrounding area.

Additional noise abatement controls will be instituted throughout the life of the proposed action to minimize potential adverse effects of construction related noise. Additional abatement can be provided through careful staging of noise intensive construction activities during daylight hours and the use of less noise intensive construction practices when possible. Construction related noise is not anticipated to pose a significant environmental impact to the surrounding area.

The projected maximum construction noise levels will not exceed the New Jersey Noise Regulation limits applicable to daytime construction. Noise generated during daytime construction would not exceed State limits, as daytime is the least sensitive period for residential land use. Other operational restrictions such as limiting simultaneous impact work to both sides will also reduce total noise levels. Equipment noise limits, which specify the use of mufflers and temporary noise barriers/curtains, may also be used if necessary. Operation and maintenance of the proposed closure structures, floodwalls, and levees would have no impact on noise.

6.12 Recreation

No long-term direct or indirect impacts to any existing or planned recreational areas after construction of the proposed flood damage reduction measures. Minor, temporary impacts associated with bird watching and hiking may occur during construction activities. Once construction is complete, there will be additional recreational opportunity such as walking, running, or biking on the easement areas adjacent to the levee/floodwall. Additional beneficial impacts include a decrease in lost recreation time as a result of flooding events.

6.13 Aesthetics

Due to the highly developed nature of the study area, the proposed flood damage reduction measures would not adversely impact the aesthetic and visual character of the Passaic River at

Long Hill Township study area. However, the earthen levee and the floodwall will create a raised linear landscape element that is different from the surrounding natural environment. The vegetation cover for the earthen levee will be different from the adjacent plant communities, and the floodwall will be a man-made feature in what was once a natural environment, creating an abrupt edge effect in both color and texture. Visual impacts of the floodwall portion of the project will be minimized by the installation of wooden fencing along the dry side of the floodwall. The fencing will provide a less obtrusive view of the structure, and will be consistent with the residential character of the project area. Additional impacts to the viewshed were minimized by limiting the height of the levee/floodwall (see plan optimization in Section 3 above)

6.14 Transportation and Other Infrastructure

Construction activities will result in minor, temporary impacts to traffic flow and volume. An increase in large slow-moving construction vehicles needed for floodwall/levee and closure structures construction will decrease traffic flow and increase traffic volume in the area. To help alleviate the temporary impacts associated with construction activities, flagmen could be available and construction signs will be posted. Upon completion of construction, no adverse impacts to local transportation systems would occur. As a project benefit, the recommended alternative will allow the local roadways to remain accessible during storm and flood events, including routine and emergency access to and from residences and businesses.

6.15 Environmental Mitigation

In accordance with both Federal guidance and Federal and State regulations, wetland mitigation is a three step process as follows: 1) avoidance of impact; 2) minimization of unavoidable impact; and, 3) compensation for unavoidable impacts. Every attempt has been made to avoid and minimize impacts to jurisdictional wetlands, transition areas, and waters of the U.S. However, implementation of the selected plan would result in 1.10-acres of unavoidable wetland impacts.

As this project is cost-shared under the Civil Works (CW) program, it is subject to the planning guidance presented in EP 1165-2-1 (30 July 99), EO 11990 on Protection of Wetlands and ER 1105-2-100 (April 2000, C.7). As such, the actions of this project must be in compliance with all applicable Federal and State laws and regulations with regard to environmental compliance. Further, it is a goal of the Corps CW water resources development program to increase the quality and quantity of the Nation's wetlands with no net loss. Therefore, in compliance with Federal and State regulations (Section 404 and 401 of the Clean Water Act, 40 CFR 1500-15808, 33 CFR 230 and the NJ Freshwater Wetlands Protection Act) regarding mitigation and restoration of wetlands, and Section 306 of WRDA 1990 (Public Law 101-640), the recommended plan chosen by this feasibility study included all practical measures to avoid wetland impacts. Where wetland impacts were unavoidable they were minimized through shifting the proposed alignment of the floodwall and converting some distance of proposed levee to floodwall.

Both Federal guidelines and regulations and State regulations require compensatory mitigation to be provided for unavoidable impacts to jurisdictional wetlands. The Federal and State requirements also dictate that mitigation must be performed prior to or concurrent with the

proposed impacts. Another common and important requirement between the Federal and State requirements is that mitigation must be provided on-site or along the same wetland or waterbody as the proposed impacts where feasible and practicable. Each of the seven (7) potential restoration sites described in Section 4 was evaluated for the potential to provide compensatory mitigation within the same watershed and in some cases within the same floodplain of the Passaic River. The results of the feasibility study indicated that none of the seven (7) sites examined provided viable opportunities for restoration. Therefore, a greater emphasis was placed on locating compensatory mitigation within or nearby the project corridor, given the results of the feasibility study and the Federal mandate to locate on-site mitigation where possible. CW plan guidance also requires the Corps to evaluate the least cost alternative for proposed mitigation. As such, purchasing credits form a nearby was mitigation bank was evaluated from an environmental, cost and regulatory feasibility standpoint. Although purchasing credits from a mitigation bank would be least costly, the proposed mitigation plan detailed below reflects the least cost alternative for on-site mitigation.

The estimated costs for completing off-site (banking) and the proposed mitigation are summarized below and presented in detail in Appendix D. It is important to restate that the CW program is obligated to comply with the Federal and State regulations that mandate on-site mitigation where feasible. According to the research conducted as part of this study, adequate on-site mitigation opportunities exist adjacent to the project corridor. If followed, this requirement limits the viable mitigation options for this project. Additional limitations include the chemical, biological and physical site constraints that typically dictate a successful wetland restoration design.

There is a difference between providing on-site mitigation and purchasing credits in a mitigation bank, where on-site mitigation is more expensive. However, the least cost alternative based on a function for function, value for value, on-site, compensatory mitigation strategy is reflected in the selected plan. The text presented below clearly indicates that the proposed mitigation features are justified and do not equate to over compensation for actual losses or unjustified increases in the Federal cost share.

6.15.1 On-Site Mitigation

As stated above it was determined that enough on-site mitigation, pursuant to both Federal and State requirements, is available to compensate for proposed wetland impacts. The CW guidance and EO 11990 state that for Federal projects no net loss of wetlands should be met through the compensation of lost functions and values and not on an acre for acre or set area ratio basis. This evaluation was completed by using a functional wetland assessment to determine what functions would be lost as a result of implementing the selected plan and the Federal compensatory mitigation requirement.

Federal Compensatory Mitigation Analysis

An Evaluation of Planned Wetlands (EPW) functional assessment was conducted within the project corridor and on a reference wetland site (potential Restoration Site No. 2). The EPW analysis evaluated the capacity of wetlands within the project corridor to provide specific functions and values. A Functional Capacity Index (FCI) value was developed for each function that the wetlands within the project corridor provide. Functional Capacity Units (FCU) were

then developed to evaluate the potential loss of function associated with the proposed 1.10 acres of wetland impacts (see Table 6-1 below). The required federal compensatory mitigation was calculated by evaluating the functional capacity of a reference forested wetland (Restoration Site No. 2) and determining what mitigation acreage would be required to offset the potential loss using the FCIs from the reference site. Table 6-1 below provides a comparison of potential functional loss within the project corridor to proposed mitigation to compensate for the proposed loss.

The EPW assessment results served as a baseline reference for estimating the functional loss associated with proposed wetland impacts and to calculate the area of compensatory mitigation required pursuant to Federal regulations and Civil Works (CW) planning guidance. Estimated mitigation costs are presented in detail in Appendix D. More detailed cost estimates will be developed in the plans and specifications phase of the project.

Table 6-1
Comparison of EPW Results for Impacted Area

Proposed Functional Loss/Wetland Impact				
Function	FCI Value	Acres	FCU Value	Total FCUs
Shoreline bank erosion control	0.25	1.10	0.28	
Sediment stabilization	0.44	1.10	0.48	
Water quality	0.46	1.10	0.50	
Wildlife	0.20	1.10	0.22	
Fish-non-tidal stream/river	0.27	1.10	0.29	
Uniqueness/heritage	0.90			
				1.77
Proposed Compensatory Mitigation				
Function	FCI Value	Acres	FCU Value	Total FCUs
Shoreline bank erosion control	0.29	0.53	0.15	
Sediment stabilization	0.95	0.53	0.49	
Water quality	0.86	0.53	0.45	
Wildlife	0.82	0.53	0.43	
Fish-non-tidal stream/river	0.48	0.53	0.25	
Uniqueness/heritage	0.95			
				1.77

As a result of the EPW comparison, it was determined that 0.53 acres of wetlands would need to be restored or enhanced to compensate for the project related loss according to Federal regulations and CW planning guidance. This is based on the FCI values of the mitigation area, which most closely resemble the impacted area, i.e., a nearby forested wetland. A summary of the estimated cost of constructing the 0.53 acres of Federal compensatory mitigation (exclusive of real estate costs) is shown below in Table 6-2.

Table 6-2
Estimated Construction Cost – Recommended Mitigation Plan

Item	*Estimated Cost*
Erosion and Sediment Control	$9,200
Clearing and Grubbing	$14,800
Dewatering	$5,900
Excavation and Grading	$17,300
Hauling and Disposal	$32,800
Place Compost	$25,800
Woody Plants	$20,400
Herbaceous Plants	$16,500
Watering and Mulching	$4,700
Fencing	$15,600
Total	**$163,000**

NJDEP Compensatory Mitigation

In addition to the Federal mitigation requirements, mitigation alternatives were evaluated in accordance with the NJ Freshwater Wetlands Protection Act rules and guidelines regarding compensatory wetland mitigation. The NJDEP mandates on-site mitigation as the preferred option where feasible and practicable. On-site mitigation is performed on or adjacent to the project impact location or if not possible on the same waterbody within the same watershed as the impact location. If a suitable on-site opportunity exists for compensatory mitigation then the applicant is normally encouraged or directed, by the NJDEP, to satisfy their requirements in this manner. On-site mitigation opportunities do exist within the project corridor, though most of these opportunities exist on private property. Permanent easements would need to be obtained or these areas would need to be purchased from the property owner. If property owners are not

willing to sell their land, on-site mitigation options may not be viable mitigation alternatives. In that case, off-site mitigation would be implemented in the form of mitigation banking.

Table 6-3
Mitigation Analysis for Selected Alternative (Locally Preferred Plan)

Selected Alternative 4	Wetland Impacts	Federal Mitigation Area	Raw State Mitigation Area	State Mitigation Area w/ Ratio Applied	Difference in raw acreage required by DEP
Total For Alternative 4	**1.10**	**0.53**	**13.15**	**1.04**	**12.61**

Comparison between Federal and State Compensatory Mitigation

The difference between the CW program mitigation requirements and the State requirements lies in the establishment of compensatory mitigation ratios and thus how the proposed mitigation is cost shared with the local sponsor. The CW program compensates for lost function and value while the NJDEP calculates compensatory mitigation through set area for area ratios based on mitigation type. Additionally, the CW program's reliance on compensation for lost function and value precludes the use of preservation as compensatory mitigation where in combination with other mitigation types preservation is an acceptable form of mitigation to NJDEP. As shown in Table 6-3, there is a 12.61 acre difference between CW program and NJDEP mitigation requirements.

As a result of the Federal mitigation requirements, the Corps' CW Program is responsible for their cost shared portion (65%) of 0.53 acres of compensatory mitigation. This would result in no net loss of function or value based on a comparison of equivalent FCU values as discussed above. NJDEP would be responsible for covering the cost associated with their share (35%) of the 0.53 acres of compensatory mitigation in addition to the remaining 12.61 acres required to satisfy the requirements of the NJ Freshwater Wetlands Protection Act.

6.15.2 Off-Site Mitigation

The seven restoration sites that were evaluated during the preliminary screening efforts for ecosystem restoration were subsequently evaluated for off-site mitigation potential. Each of the seven sites is described in Section 4 of this report. None of the sites offer viable compensatory mitigation either in terms of proximity to proposed impacts, ecological lift and/or overall area.

If efforts to locate or secure on-site mitigation or nearby off-site mitigation fail, an additional option, used only as a last resort, would be to purchase wetland mitigation credits from the C & C Builder's Bank. The service area for C & C Builders Bank covers the Passaic River Drainage Basin, which includes portions of Passaic, Bergen Morris, Essex, Sussex, Hudson and Somerset Counties. The bank is currently selling freshwater wetland mitigation credits for 175,000 per acre credit. Sale of the fill credits is limited to within the Central Passaic Basin. The 188-acre bank is located in Fairfield Township, Essex County, NJ. The bank includes forested, scrub-shrub and emergent wetland habitat types. The amount of wetland bank credits required to satisfy Federal mitigation requirements would have to be evaluated through an EPW functional wetland assessment of the bank. Additionally, the purchase of wetland bank credits would have

to be approved by the NJDEP as compensatory mitigation in order to authorize issuance of the 401 WQC.

6.16 Environmental Justice

In order to have potential environmental justice impacts, a proposal must have potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes. This action has been evaluated for potential disproportionately high environmental effects on minority and low-income populations and there would not be a high human health or environmental impact on minority and low-income populations. The minority population within the affected area does not exceed 50 percent and there are not more minorities in the affected area than other areas of the community. Implementing any of the alternatives would not result in any change to environmental resources that individuals involved in subsistence fishing or hunting utilize. None of the alternatives would involve the release of hazardous, toxic, or radioactive materials to which minority or low-income populations could be exposed. As such, the context nature of the alternative being considered precludes the potential to create disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes.

6.17 Cumulative Impacts

Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time frame. Therefore, the cumulative impacts of an action can be viewed as the total effects on a resource or ecosystem of that action and all other activities affecting that resource regardless of the entity (federal, non-federal, or private) taking the actions. CEQ's regulations require that cumulative impacts be considered along with temporary and long term impacts in order to ensure that the range of actions considered in NEPA documents includes not only the proposed action, but also all actions that could contribute to cumulative impacts.

The primary impact of the recommended project would be to 1.10 acres of freshwater wetlands located along the project corridor. Other actions within the project corridor that have also caused adverse impacts to forested and emergent freshwater wetlands and surrounding transitional habitats included the historic construction of approximately 46 single family homes, Loudenberry Commons, several commercial facilities including the ShopRite Plaza along Valley Road within the project corridor. In addition the Department of Public Works building complex and the wastewater treatment plant were constructed south of Valley Road on Warren Avenue. The construction of the Riverside Recreation Park, and the new Longhill Township Town Hall caused small impacts to forest, floodplain forest and wetland habitats including minor impacts to barred owl habitat.

However, like the proposed project, these actions took steps to avoid or minimize impacts, including the planting of a buffer zone along the eastern edge of Riverside Park. Ongoing wetland impacts within the project corridor take the form of manicuring jurisdictional wetlands into lawns and backyards plus maintenance of the PSE&G right-of way. Many residential dwellings have planted and maintain lawns in wetland areas. The PSE&G right-of-way was floodplain forest at one time, presently woody vegetation is prevented from re-establishing by ongoing maintenance activities. At this time, this represents a loss of wetlands in the project

corridor. Overall, these impacts have not resulted in a significant loss of wetland habitat in the project corridor.

Future potential impacts lie in plans for a strip mall east of the proposed flood wall, and several small multi-home developments on the south side of Valley Road. These projects may result in additional freshwater wetland losses, depending on their design and level of permittability. Permanent impacts include the conversion of 1.10 acres of degraded wetlands floodwall, levee and maintained right-of-way. These impacts would be compensated for by implementing the proposed wetland mitigation plans outlined in Section 6.15 above. Therefore, no cumulative impacts are anticipated as a result of implementing the selected plan.